

off and intact, might easily lead one to conclude that the sounds were produced by some other organ than the wings.

The question may well be asked, "Why are the spiracles so modified and complex as Landois considers them?" It must be taken into consideration that the spiracles are comparatively large openings to a very delicate and vital tracheal system, which should be safely guarded at its openings against the entrance of dust particles. In most cases they are protected by a dense growth of hairs but often are not, as for example in the honey bee. The thoracic spiracles of the honey bee are poorly protected externally but within the opening this folded membranous curtain, or so-called vocal membrane, acts undoubtedly as a screen against the entrance of dust, etc.

The work described in this paper was done in the Entomological Laboratory of Stanford University.

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## THE STRIDULATIONS OF TWO INTERESTING LOCUSTIDÆ.<sup>1</sup>

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The writer's first night collecting on Plummer's Island, near Washington, D. C., August 25, 1909, made him acquainted, for the first time, with the stridulation of *Atlanticus pachymerus* Burmeister. It was singing after dark very close to the ground on a dry, rocky, thinly-wooded hillside. The notes of this odd-looking locust have the same lisping character as an *Orchelimum*. The phrases are brief, but rapidly repeated, with irregular intervals of silence intervening, sh-sh-sh-sh-sh—sh-sh-sh-sh—sh-sh-sh-sh-sh. One is reminded of the prolonged, lisping phrases of *Orchelimum molossus* Rehn. Several times, while watching the insect stridulate by lantern-light, the writer lisped an approach to its notes and got an immediate response. The grayish brown coloration of this locust is well adapted to its environment of dead

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<sup>1</sup> Identified by Mr. A. N. Caudell of the U. S. National Museum.

leaves and vegetation. The tegmina are very short, giving the insect an awkward, unfinished appearance.

*Pyrgocorypha uncinata* Harris. In October, 1909, the writer took a single female of this interesting locust at Thompson's Mills, Northern Georgia. This individual had entered a dwelling and was crawling on the wall, probably attracted by a lighted lamp. No other individuals were taken until the writer captured a single male in stridulation in the same locality one dark night in October, 1910. The insect was traced by its note to the low grass and weeds on a bank almost in the midst of the settlement. By the strong light of a bull's eye lantern the writer approached within a foot or two of the insect which continued to stridulate vigorously for some time, even though in the full glare of a strong light. After its notes had ceased, the insect at intervals jerked its body and wings spasmodically without producing any sound. This peculiar behavior is characteristic of a number of species of *Conocephalus* when disturbed during stridulation.

As Mr. A. N. Caudell has pointed out, it is probable that the male taken in Northern Georgia had not arrived at the adult stage very long before its capture, since its tissues, which must have been soft, had shrunken considerably after mounting and drying. On the grass and weeds very near where this male was taken, the writer a night or two before heard several locusts in stridulation, presumably individuals of *Pyrgocorypha uncinata*. As these insects were heard in stridulation but one or two nights, it is possible that the stridulation period of this *Pyrgocorypha* is very brief. The stridulation of this locust is a loud, penetrating, prolonged z-z-z-z-z-z-z-z-z-z-z-z-z-z-z-z quite like the notes of a *Conocephalus*. Its habits in many ways are very similar to those of a *Conocephalus* which it resembles in some respects.

Previous to the writer's observations in Northern Georgia, the stridulations of *Pyrgocorypha uncinata* appear to have been unknown.

December, 1910.